

REMARKS

Claims 9, 10 and 15-20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Asao et al. (JP '834; hereafter, "Asao"), and claims 1-8 and 14 stand rejected under 35 U.S.C. § 103 as being unpatentable over Asao. These rejections are respectfully traversed for the following reasons. As a preliminary matter, Asao does not disclose an absolute magnitude of "0" as alleged and relied on by the Examiner but instead discloses an absolute magnitude of "*almost* 0". Accordingly, JP '834 does not disclose a lead-free article of "0" magnitude and the Examiner's reliance on such an interpretation of Asao in the pending rejections is improper. The Examiner is reminded that "inherency may not be established by probabilities or possibilities", *Scaltech Inc. v. Retec/Tetra*, 178 F.3d 1378 (Fed. Cir. 1999).

The Examiner asserts that Asao "teaches that an article such as a printed circuit board with a bar code 2 imprinted of 'absolute magnitude' number 0 ... refers to a *lead* free item ... " (emphasis added). However, as set forth in the previous response, the bar code 2 of Asao does NOT refer to lead content *specifically* but rather refers to heavy metal content *collectively*. Although lead is one type of heavy metal, there are many other heavy metals commonly used in semiconductors (e.g., Sn, Bi, Au, Ag, etc.). Accordingly, the bar code 2 of Asao indicates only whether an arbitrary heavy metal is contained in the semiconductor device. Asao does NOT differentiate between lead and other types of heavy metals. Accordingly, an indication of a presence of heavy metal in Asao does not definitively indicate whether *lead* is present or not because the presence of heavy metal can be attributable to any one or more of the aforementioned other heavy metals common in semiconductor devices.

Assuming Asao disclosed a “0” magnitude, and in order to clarify/emphasize the distinction between the present invention and Asao so as to overcome the incidental possibility that the Asao bar code could imply no lead, claim 9 has been amended to recite “*lead* identification information indicating *presence of lead in said article when said article contains lead and indicating absence of lead in said article when said article does not contain lead*” (claims 1, 8, 11 and 12 have been similarly amended). Accordingly, the claims make clear that the indication information is designed to *definitively* indicate when lead is *both* contained or not contained in an article.

In contrast, Asao discloses only a process which determines the absolute magnitude of heavy metals generally that are present in the device, but does not provide identification information with respect to *lead* specifically. For example, when the bar code of Asao indicates a presence of heavy metals, such an indication does not necessitate the presence of lead. That is, the bar code of Asao could indicate a presence of heavy metal (e.g., Sn, Bi, Au, Ag, etc.) in a semiconductor which does NOT include lead. It should be noted that Asao merely references lead as one example of a heavy metal and expressly discloses that the indication of the bar code refers not to lead content only but to *total* heavy metal content.

As anticipation under 35 U.S.C. § 102 requires that each and every element of the claim be disclosed, either expressly or inherently (noting that "inherency may not be established by probabilities or possibilities", *Scaltech Inc. v. Retec/Tetra*, 178 F.3d 1378 (Fed. Cir. 1999)), in a single prior art reference, *Akzo N.V. v. U.S. Int'l Trade Commission*, 808 F.2d 1471 (Fed. Cir. 1986), based on the forgoing, it is submitted that Asao does not anticipate claims 1, 8, 9, 11 and 12, nor any claim dependent thereon.

It is respectfully submitted that the present invention provides new and unexpected results whereby benefits and advantages over the prior art are obtained. Only Applicants considered the unique problems related to Pb and differentiated Pb from other heavy metals, and conceived and enabled the means by which to overcome those problems. Indeed, only Applicants have considered such issues as Pb being more harmful than other heavy metals, and Pb being generally contained in a general solder material. As previously mentioned Pb is not only a kind of heavy metal, but Applicants have identified the removal of Pb as being very preferable relative to other heavy metals. Furthermore, only Applicants have identified that it is easy to use a Pb-free solder with the indication thereof, but it is very difficult to indicate the content of each heavy metal because the content is varied substrate by substrate.

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as the independent claims are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination.

For example, regarding claim 16, the Examiner alleges that Asao “teaches that the lead containing *article* is recycled ...” (emphasis added). However, as set forth in the previous response, Asao expressly discloses separating the metal components from the alleged article (“printed circuit board”) so as to recycle only the unattached components having heavy metal

content *without the circuit board*, thereby requiring mass redesign of the circuit boards which increases complexity and cost. In fact, Asao is concerned only with recycling components having heavy metal content collectively without differentiation to lead, and moreover desires recycling of *individual* components rather than the packaged circuit board *as a whole* (i.e., Asao recycles by first separating the components from the circuit board so as to recycle the components only, and is based on the *total* heavy metal content). On the other hand, the present invention can provide a simple, efficient process which can recycle, for example, the circuit board together with the parts attached thereto by reference to the indication information regarding lead content. In short, Asao does not recycle the circuit board as a whole with parts attached thereto, let alone based on lead content. Instead, Asao recycles only metal components which are *detached* from the board, and based on total heavy metal content.

It would be ideal to recycle *all* heavy metals as well as *separating* such heavy metals from the circuit board as disclosed by Asao; but in order to do so, the structure of the circuit board would have to be changed thereby leading to technical complexity resulting in increased cost and decreased efficiency. Only Applicants have conceived and enabled a process by which the article as a whole is recycled while a lead-free article as a whole can be disposed, and based specifically on the lead content.

As another example, regarding claims 14 and 15 which recite in pertinent part, “wherein the identification information is recognizable by a human,” Asao appears to disclose only a bar code that would require a bar-code reading machine for recognizing its content. The Examiner alleges that the markings from 0-5 shown in Table 1 are recognizable by humans. However, Table 1 appears to merely illustrate data that was first recognized by a *bar-code reading machine* and then translated and reproduced for a human.

Accordingly, the bar-code itself carried on the articles would not be recognizable by a human. The Table 1 data is NOT the “identification information” *carried on the article* itself. That is, the Table 1 data represents a reproduction of the bar-code on the article which was reproduced by a bar-code reading machine. As is commonly known with regard to bar-codes, the bar-code *carried on the article* is itself not recognizable by a human. The Examiner should compare and differentiate between claims 14,15 and claim 5 with respect to the claimed “bar code” therein. According to claims 14,15, no bar-code reading machine is necessary so as to enable a more efficient process.

The Examiner is respectfully requested to reconsider the withdrawal of claims 11-13 in view of the amendments thereto, which are submitted to place claims 11-13 in condition for allowance for at least reasons similar to those discussed above with respect to claim 9.

CONCLUSION

Having fully and completely responded to the Office Action, Applicants submit that all of the claims are now in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

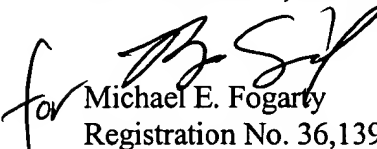
To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this

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paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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